

## **REMARKS/ARGUMENTS**

The present Amendment is responsive to the final Office Action mailed January 5, 2007, in the above-identified application.

Claims 7, 8, 10-12, 14, 21-24 and 27-30 are the claims currently pending in the present application.

Claims 11 and 28 are amended to clarify the recitations thereof. This amendment is not believed to raise new issues that will require further searching.

### ***Rejection of Claim 28 under 35 U.S.C. § 112***

Claim 28 is rejected under 35 U.S.C. § 112 on the ground that the term “droplets” lacks antecedent basis. It is respectfully submitted that a person of ordinary skill in the art would have readily understood claim 28 as claimed. However, the claim is amended to expedite prosecution of the present application.

### ***Rejection of Claims 7, 8, 10, 21, 22, 27 and 29 under 35 U.S.C. § 103***

Claims 7, 8, 10, 21, 22, 27 and 29 are rejected under 35 U.S.C. § 103 as being obvious from Aoki et al., U.S. Patent No. 5,635,053 in view of Okuda et al., U.S. Patent Application Publication No. 2002/0035762 as evidenced by Verhaverbeke, U.S. Patent No. 5,972,123, Tomita et al., U.S. Patent No. 6,431,185 and Skee, U.S. Patent No. 6,465,403. Reconsideration of this rejection is respectfully requested.

The Examiner alleges that Aoki teaches a first step of applying an alkaline solution and a second step of applying an acid solution to clean a surface of a substrate, and further teaches using cleaning solutions in multiple steps in any combination. Further, the Examiner alleges the combination of Aoki and Okuda would have been obvious to a person of ordinary skill in the art absent a showing of criticality, that is, a new or unexpected result which is different in kind, not merely in degree, from results of the prior art (Office Action, page 8).

According to an aspect of applicant's invention as claimed in claims 7 and 29, a three step process for cleaning a substrate surface is provided which achieves an efficient removal of particle and metal contaminant from the surface of the substrate. In a first step, droplets of alkaline solution are injected to a surface of a substrate and thereby particles are removed from

the surface of the substrate due to the physical impact of the droplets. In the second step, since an acid solution is supplied to the surface of the substrate, metal contaminants adhering to the surface dissolve and can be removed. That is, according to an aspect of applicant's invention as claimed in claims 7 and 29, a slight etching of the surface occurs during the second step and thereby particles deeper in the substrate emerge at the surface of the substrate so that they can be efficiently removed in the third step. Then, in the third step, droplets of the alkaline solution are applied to the surface of the substrate and particle and metal contaminants that have become exposed at the surface of the substrate in the second step as a result of the slight etching are efficiently removed by the physical impact of the droplets. This third step is not a mere repetition of the application of an alkaline solution to the surface but is a completion of the process of the above-outlined three steps as a complete process.

The Examiner alleges that it would have been obvious to one of ordinary skill to apply cleaning solutions in multiple steps in any combination as required for a particular product in order to achieve the required cleanliness, unless there is a showing of criticality, or a new or unexpected result which is different in kind. It is respectfully submitted that applicant's invention as claimed in claims 7 and 29 achieves a new and unexpected result because foreign materials adhering to the surface are removed, however, etching of the surface is suppressed.

Among the problems recognized and solved by applicant's invention as claimed in claims 7 and 29 is that the application of an acidic substance to clean the surface causes etching of the surface and a lowering of the level of the substrate (see Drawing 1 of attached Appendix). According to an aspect of applicant's invention as claimed in claims 7 and 29, the droplets are injected to the surface (per claim 7) or alkaline solution of ammonia water and hydrogen peroxide is supplied to the surface (per claim 29) at the same time or after the supply of acidic solution. Thus, foreign materials are removed even without deep etching. As shown by way of illustrative example in attached Drawing 2 of the Appendix, although the surface of the substrate is etched only to a limited extent, extraneous matter may still be removed from the surface of the substrate due to the physical effect of injection of droplets to the surface (per claim 7) or alkaline solution of ammonia water and hydrogen peroxide supplied to the surface (per claim 29) after or at the same time as the application of the acidic substance. Therefore, according to this aspect of applicant's invention as claimed in claims 7 and 29, the amount of etching of the surface is

suppressed but the foreign materials adhering solidly to the surface of the substrate can still be removed.

In a similar vein, the Aoki and the other cited references, even taken together in combination, do not disclose or suggest injecting droplets or supplying the alkaline solution performed at the same time or after the supplying of the acid solution. Since Aoki and the other cited references do not disclose or suggest this feature, they are incapable of disclosing or suggesting the combination of the steps of applying droplets of alkaline solution, supplying the acid solution to the surface and, in the third step, injecting droplets of alkaline solution or applying the alkaline solution of ammonia water and hydrogen peroxide solution following or virtually at the same time as the second step.

Claims 8, 10, 21, 22 and 27 depend from claim 7 and are therefore patentably distinguishable over the cited art for at least the same reasons.

Further with respect to claim 8, claim 8 recognizes that the injection of droplets is performed only in the first and third steps. Accordingly, the excessive impact of the acid solution is avoided. This combination of injection of droplets in the first and third (alkaline) steps but not in the second (acid) step is not disclosed or suggested by the cited art.

***Rejection of Claims 11, 12, 14, 23, 24, 28 and 30 under 35 U.S.C. § 103***

Claims 11, 12, 14, 23, 24, 28 and 30 are rejected under 35 U.S.C. § 103 as being obvious from Aoki in view of Hall, U.S. Patent No. 4,326,553 or Bran, U.S. Patent No. 6,039,059, as evidenced by Verhaverbeke, Tomita and Skee. Reconsideration of this rejection is respectfully requested.

Independent claims 11 and 30 require the above-described three step process for cleaning a substrate surface. As discussed, Aoki and the cited art do not disclose or suggest a process with such features. Further, as discussed, Aoki and the cited art do not disclose or suggest the problems recognized and solved by applicant's inventive process as claimed in claims 11 and 30, and do not achieve the new and unexpected results achieved by applicant's inventive process as claimed in claims 11 and 30. Therefore, claims 11 and 30 would not have been obvious based on the cited art.

Moreover, claim 11 requires that, as part of the third step, alkaline solution subjected to megasonic vibrations is supplied after the second step to facilitate the removal of extraneous matter exposed in the second step. This combination is also not disclosed or suggested by the cited art.

Claims 12, 14, 23, 24 and 28 depend from claim 11 and are therefore patentably distinguishable over the cited art for at least the same reasons.

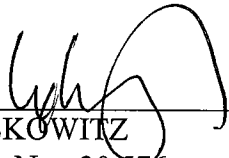
In view of the foregoing discussion, reconsideration of the rejections is respectfully requested and allowance of the claims of the application is believed to be warranted. Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

Should the Examiner have any questions regarding the present Response or regarding the application generally, the Examiner is invited to telephone the undersigned attorney at the below-provided telephone number.

THIS CORRESPONDENCE IS BEING  
SUBMITTED ELECTRONICALLY  
THROUGH THE UNITED STATES  
PATENT AND TRADEMARK OFFICE  
EFS FILING SYSTEM  
ON April 6, 2007

MM:GB:ns  
Enclosure

Respectfully submitted,

  
MAX MOSKOWITZ  
Registration No.: 30,576  
OSTROLENK, FABER, GERB & SOFFEN, LLP  
1180 Avenue of the Americas  
New York, New York 10036-8403  
Telephone: (212) 382-0700